Have Maternal Mortalities Been Decreased Since Last Decade with Improving Maternity Care?

Son On Yılda Antenatal Bakım Arttırılarak Anne Ölümleri Düşürüldü Mü?

Maternal Mortalities

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Özet

Amaç: 2005-2013 yılları arasında Zonguldak ilindeki anne ölümlerini araştırmak. Gereç ve Yöntem: 2005-2013 yılları arasında Zonguldak İl Sağlık Müdürlüğü'ne bildirilen "Anne Ölüm Formu" kayıtları incelendi. Total olarak 20 hasta gravida, parite, eğitim durumu, ölüm zamanı, ölümde gecikme yaşanıp yaşanmadığı, ölüm nedenleri açısından incelendi. Bulgular: 20 hasta nın ortalama yaş, gravida ve paritileri sırasıyla 30,6±5,9 yıl, 2,75± 1,8 ve 1,65± 1,2 idi. Maternal ölümlerden 9'u indirekt, 7'si direkt ve 4'ü de tesadüfi sebeplerden dolayıydı. Ölümlerin %23,7'si antepartum, %76,3'ü ise postpartum dönemdeydi. Postpartum 13 ölümün 7'si (%53)'ü ilk haftada, kalan 6'sı (%47) ise ilk aydaydı. Tartışma: 2005 Sağlıkta Dönüşüm Politika'sından sonra anne ölüm oranlarında ciddi bir düşüş olmuştur. Çalışmamızdaki anne ölüm oranları Türkiye istatiskleri ile paraleldir. Anne ölümleri nedenleri üzerinde sistemik çalışmalara devam ederek ve antepartum ve postpartum bakımı arttırarak ölüm oranlarının minimal seviyeye indirilebiliceğini ümit ediyoruz.

Anahtar Kelimeler

Anne Ölümleri; Antenatal Bakım; Postpartum Bakım

Abstract

Aim: To investigate maternal mortalities in Zonguldak province between 2005-2013 years. Material and Method: The deaths recorded by "maternal mortality forms" reported to Local Health Authority between 2005-2013 years were investigated. Totally 20 cases were investigated for gravida, parity, educational status, the time of death, whether the delay was present or not in the death and the causes of death. Results: The mean age, gravida and parities of 20 cases were 30,6±5,9 ages, 2,75± 1,8 and 1,65± 1,2 respectively. Of the maternal mortalities 9 were due to indirect, 7 were due to direct and 4 were due to coincidental causes. 23.7 % of deaths were occured in the antepartum and 76,3 % in the postpartum period. 7(53%) of 13 postpartum deaths were in the first week and the rest 6(47%) were within the first month. Discussion: There has been serious decrease in the maternal mortality rates in our country after the health transformation politics since 2005. The maternal mortality rates in our study were parallel to Turkish statistics. We hope that we can decrease the mortality rates to minimal levels by holding on the systematic studies on the causes of maternal mortalities and increasing the antepartum and postpartum care.

Keywords

Maternal Death; Antenatal Care; Postpartum Care

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Introduction

Maternal mortality is defined as deaths due to pregnancy complications during the pregnancy period or the postpartum period for 6 weeks [1]. Maternal Mortality Rate (MMR) is one of the most important predictor of maternal health status in a population.

United Nations "Millennium Declaration" is signed by 189 country in United Nations 2000. "Millennium Develeopment Goals" for 2015 were declared. The three of the eight main goals in the declaration were directly about the health. Maternal health was the most important subject within the health pronlems. For this reason thirteen developing countries including Turkey aimed to catch 2015 Millennium Development Goals (MDG).

According to the datas the maternal mortality was decreased from 409.000 in 1990 to 273.000 in 2011 (1). In our country within the last decade new health starategies have been developed by The Ministry of Health to decrease MMRs. MMR was decreased from 64/105 to 15,5/105 from 2002 to 2011 with these strategies [2].

Low socioeconomic status and educational level, multiparity, insufficient antenatal care and alimentary supplements are the main risk factors causing the maternal mortality. Approximately 528.000 maternal mortality occurs worldwide [3]. Studies are going on to decrease the maternal mortality (MM) in all countries. National Maternal Mortality Study in 2006 showed that 37% of the maternal deaths occured during pregnancy, 9% during parturition and 54% during 6 weeks postpartum period. According to the study results, the majority of deaths were due to postpartum bleeding and gestational hypertension or preeclampsia [4]. NMMS (National Maternal Mortality Study) in 2009 revealed that 59% of pregnants were died because of direct and 16% of indirect maternal causes. Coincidental causes are 23% of total maternal mortality [5].

The Ministry of Health published Antenatal Care Management, Labour and Ceserian Section Management Postpartum Care Management and Emergency Obstetrics Care Management Manuals. The tasks aiming to decrease the rate of MM, play important role in evaluating the health services and in troubleshooting. We aimed to investigate the MM cases between 2005-2013 years in this study.

Material and Method

MM Committee has been built by Local Health Authority in all provinces, after 2005-2006 National Maternal Mortality Study. The committee in Zonguldak consists of an Obstetrician/Gynecologist, an Anesthetist, an Internal Specialist and two practitioner studying at Local Health Authority. In MM Committee periodic meetings maternal mortalities, causes of mortality, precautions for mortality have been discussed. In this study we examined the "maternal death records" in Zonguldak province between 2005-2013 year. This longutudinal descriptive study was approved by Bülent Ecevit University and Local Health Authority.

The information of maternal deaths were taken from "maternal death records" standardized by The Ministry of Health. The form consisted of 48 sections containing the informations about characteristic properties, obstetric histories, the date and place of death, the delay models [6]. Direct maternal deaths were defined as deaths due to complications during pregnancy, in labour or postpartum period (hemorrhage, sepsis, preeclampsia, eclampsia, obstructed labour or anesthetic complications during ceserian section). Indirect deaths were defined as the deaths due to systemic disease, initiated before or during pregnancy/ postpartum period, and their complications. Coincidental maternal deaths were defined as deaths due to traffic accident, neoplasm, or other diseases which could not be related with the pregnancy. The maternal mortality rate was calculated as the number of maternal deaths per 100,000 live births. The coincidental (incidental) maternal deaths were not included to MM ratios. Three delay models defined in the maternal deaths are:

- First delay: The delay in the decision of taking the health service
- Second delay: The delay on the way to the health service
- Third delay: The delay in the health service

The datas were evaluated with SPSS 18 package progarmme. The descriptive analysis for the data were expressed as mean ± standard deviation or median for continous variables. The frequencies of the variables were expressed as percentages.

Results

The number of maternal deaths were twenty in Zonguldak between 2005-2013 years. Seven of them were direct, 9 were indirect, 4 were coincidental maternal deaths. The maternal mortality rates and live births between 2005-2013 years are shown in Table-1. The coincidental deaths were not included in calculating the maternal mortality ratios.

Table 1. The maternal mortality rates and the number of live births between 2005-2013 in Zonguldak province

Year	Number of Live births	Antepartum Death(n)	Antepartum maternal mortality rate	Postpartum Death(n)	Postpartum maternal mortality rate
2005	2,079	1	48.09	0	0
2006	**7,272**	0	0	1	13.75
2007	**9,523**	1	10.5	1	10.5
2008	**7,246**	0	0	1	13.8
2009	**8,571**	0	0	3	35
2010	**8,635**	1	11.5	4	46.32
2011	**8,403**	0	0	1	11,9
2012	**7,352**	0	0	1	13,06
2013	**7,199**	0	0	1	13.89
Total	**66,280**	3	4.526	13	19.6

When the maternal deaths were compared according to the years the death rates were the most in 2010 and the least in 2011with the frequencies of 25% and 5% respectively (Figure-1).

The mean maternal age was 30.6± 5.9 years, the median gravida was 2 (1-7) and parity was 2 (0-4). The educational levels of the mothers were shown in Table-2. Forty percent of mothers were graduated from primary school, fifteen percent from the college (Table-2).

The number of indirect maternal deaths were 9, direct were 7 and coincidental deaths were 4. The two coincidental deaths were antepartum and two of them were postpartum. The coin-

Figure 1. Maternal mortality rates with respect to years. The numbers are given as percent values.

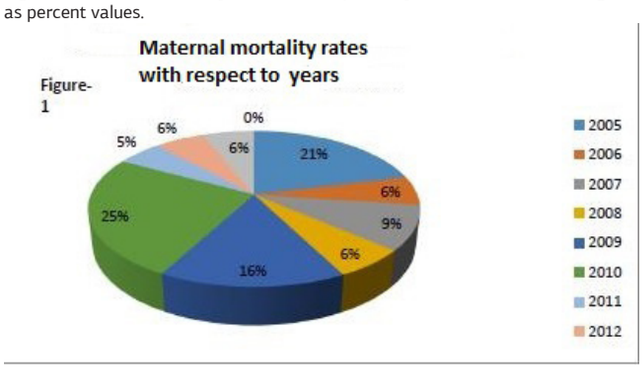

Table 2. The demographic properties of the maternal motality cases(n=20)

	N(number)	%(Percentage)
Age		
20-25	5	25
26-30	4	20
31-35	6	30
36-40	5	25
Gravida		
<3	11	55
≥3	9	45
Parity		
0	4	20
<3	12	60
≥3	4	20
Liveborn		
0	5	25
<3	12	60
≥3	3	15
Education level		
Illiterate	1	5
Primary school	8	40
Middle school	2	10
High school	6	30
College	3	15

cidental deaths were not accepted as maternal deaths. Of the rest 16 patients 56% was dead because of the indirect maternal causes and 44% was because of the direct causes (Table-3).

Table 3. The classification of the maternal mortalities between 2005-2013 years

Death classification	N	%*	%**
indirect	9	45	56
direct	7	35	44
coincidental	4	20	---
Total	20	100	100

*Percentages among whole maternal deaths ** percentages when the coincidental causes were disregarded

Approximately one third of the indirect maternal deaths were antepartum, on the other hand the whole direct maternal deaths were at postpartum period. Seven (53,8%) of postpartum maternal deaths were direct and 6 (46.2%) were indirect maternal deaths (Table-4).

Seven (53%) of thirteen postpartum maternal deaths were during the first week after labour or ceserian section and the rest six (47%) occured within the first month. Eight (40%) of the deaths happened at the hospital where the mother gave birth, 10 (50%) of the patients died at the referred hospital. The rest 2 (10%) of the patients died outside, one from traffic accident on way home and one from cardiopulmonary arrest while transporting to the hospital with ambulance. All the reffered patients were transported by ambulance to tertiary hospital. In two patients first degree delay occured due to the delay in decision for taking the health service. Second degree delay due to the defect in transport service and third degree delay due to the delay in the health service supply or treatment did not occur in any of the patients.

Table 4. The maternal mortalities according to time and classification of the deaths. The datas were given as n(%).

	The time of birth		
The classification of maternal deaths	antepartum	postpartum	Total
Indirect	3 (18,7 %)	6 (37,5 %)	9 (56,2%)
Direct	0 (0 %)	7 (43,8%)	7 (43,8 %)
Total	3 (18,7 %)	13 (81,3 %)	16 (100 %)

Five of nine direct maternal deaths were caused by the postpartum bleeding and hemorrhagic shock due to uterine atony; disseminated intravascular coagulation (DIC) and multiorgan failure. The oher two of the direct maternal deaths were due to the complications of HELLP (Hemolysis, Elevated Liver enzymes, Low Platelet count) syndrome. The indirect maternal deaths were caused by trombophilia, cardiac diseases and sepsis (Table-5).

Table 5. The causes of maternal mortalities

Cause	N (%)
Postpartum bleeding	5(%25)
HELLP	2(%10)
Trombophilia	4(%20)
Cardiac Diseases	3(%15)
Sepsis	2(%10)
Other	4(%20)
Total	20(%100)

Discussion

According to 2011 statistics in Turkey, the maternal mortality rate was decreased from 64 per 100.000 live births by the year 2002 to 15.5 per 100.00 live births in 2011 [7]. In our study we reported that MMR in Zonguldak province was decreased from 48 to 13.89 per 100.00 live births since 2005 to 2013. The decrease in maternal mortality ratios in Zonguldak province was similar to the decrease in whole Turkey. The evolution in the health politics played important role in this decrease. With the aid of these politics 30% decrease between the years reached to 76% decrease between 2003-2011 years [7]. So we can easily say that 2015 MDG's(the development goal of United Nations) of 75% decrease in the maternal deaths could have been achieved by the year 2011. Also Turkey became one of the five countries which decreased the maternal mortality below 20 by the year 2008. According to 2012 World Health Organisa-

tion datas, the maternal mortalities in developing middle-class countries and Europian region in 2010 were 53 and 20 retrospectively, whereas in Turkey this ratio was 16,4 and in upper class countries was 14 in 2010. The biggest decrease in the maternal death ratios was in Turkey with 76% between 2003-2011 years [7]. These datas show us that great achievement was performed for the maternal mortality in Turkey from 2000 to 2010.

The mean age of the dead mothers was 30.6 in our study. Biri A et al. studied MM between 1997-2000 years in Ankara. The mean age of the mothers in their study was 30.2 which was similar with our study [8]. The increased maternal age was suggested to be a risk factor for deaths in this study. The mean age of the cases in a study in Ethiopia hospitals was approximately 27.4 ± 6 years (median, 35 years; range, 13–48 years) [9]. In our study the direct and indirect maternal deaths were caused by the complications of the systemic diseases with the increased age.

The mean and the median gravida of the mothers in our study were 2.75 and 2 respectively. The low median gravida level was not evaluated as a risk factor but for the patients with the gravida and parity above 5 increased the risk of MM with increased age and systemic diseases.

NMMS in 2009 stated that %59 of the maternal deaths were due to direct, 16% were due to indirect and 23% due to coincidental causes [5]. Gebrehiwot Y, in their study 76% maternal deaths were attributed to direct obstetric causes. Indirect obstetric causes were responsible for 7% cases [9]. A cross-sectional study performed in Bangladesh reported that 78.8% of maternal detahs occured in the first 6 hours postpartum period [10]. The majority of the deaths (70.4%) in the study were classified as direct maternal deaths, the rest 12.4% as indirect and 13.8% as unspecified [10]. Haemorrhage was the most common cause of death(38%), eclampsia (20%) and sepsis (8.1%) were less common. In our study 35% of the MM was due to direct, 45% was due to indirect and 20% was due to coincidental causes.

The most important of the inevitable direct causes are postpartum bleedings. The haemorrhage causing deaths are mostly due to the ablatio placenta, placenta previa, postpartum uterine atony and the ectopic pregnancy rupture. In a study in Turkey, 32.8% of maternal mortalities were due to hemorrhage which was caused by the placental causes, postpartum bleeding and the rupture of ectopic pregnancies [11]. Obiechina Nj et al. in their study stated that 27% of the direct maternal deaths were due to preeclampsia, 22% were due to bleeding and 18% were due to sepsis [12]. We reported that 25% of the direct maternal deaths were caused by the placental pathologies and postpartum haemorrhage. The other causes of the direct maternal mortalities were postpartum bleeding due to uterine atony, HELLP syndrome, DIC due to postpartum bleeding. The increase in the blood banks and improvement in secure blood transfusion played important role in decreasing the incidence of the deaths, since bleeding had been the the first reason of MM before 2005.

Preeclampsia and its complications are other important factor in the maternal deaths. The differences in the socioeconomic level, living region of patients and different management protocols of the doctors have influence on the mortality ratios. Main reason for sudden death in preeclampsia are the cerebrovascular accident and cardiopulmoner arrest. Previous studies reported that 20% of MM were caused by preeclampsi [9,10]. on the other hand 10% of the maternal deaths were due to preeclampsia in our study.

Two thirds of whole maternal deaths were indirect or coincidental according to our records. Main causes were tromboemboly and cardiac diseases 30% and 23% respectively. These results showed us that more attention should be given to the patients having the risk factors especially for cardiac diseases or trombophilia.

Fifteen percent of the mothers died due to neoplasms in this study which were similar to the study of Troncon JK et al. who reported that 14% of the maternal deaths in southeast Brasil were due to neoplasms [13]. In this study 10 % of deaths were due to sepsis which was also compatible with the study of Obiechina Nj [12].

Halim A et al. reported that 47.8% of deaths occured at facility level, 17% occured en route to healthcare facility and 35.2 % died at home. The health facility quality is stated to be improved. In the study it was reported that healthcare providers' knowledge and skills to manage emergency obstetric care should be strengthened.Also functional referral pathway between healthcare facilities was suggested to be ensured.

Turkey Ministry of Health created strategies after 2005 National Maternal Mortality Study. The first of them was the improvement in the referral pathway between healthcare facilities. In the past because of the delay in the referral pathway and the unawareness of the health services, first degree and second degree delays causing maternal deaths were most often. But after "The Transform Project in the Health" these first and second degree delays were significantly decreased. By this project the follow-up of the pregnants by the family doctors were firmly controlled, so the utilization of the pregnants from the first degree health care was supplied. By the aid of coordinations in the referral system between hospitals, the problems in the patient transport were significantly eliminated. After the evaluation of the maternal mortality datas in 2005, meetings for the collaboration of the health sectors on the emergency obstetrics care have been made .The strategies include in-service trainings for healthcare staff to strengthen their knowledge and skills, improvements in the support of medical materials, referral pathway of the patient and transport of blood products have been improved . Also record systems of the pregnants have been improved and common maternal death forms were supplied. The death records have been collected trustworthy by the Maternal Death Committees founded in every cities. By this way the datas have been collected more easier and the precautions have been well noted. By the aid of these precautions the maternal death ratio has been decreased 76% since 2003. By the year 2011 MDGs for 2015 MM ratio has been already reached. So we can say that the reforms since the past decade have been very appropriate.

In future to decrease the maternal mortality rates more the prerequisites that the healthcare providers should do are: determine the antenatal risk factors earlier, increase the visits of moderate-high risk patients, report these patient risks and send

them to tertiary hospitals in the appropriate time. The patients with the placental patologies should be hospitalised in the tertiary hospitals in the third trimester (placenta previa, placenta accreata vs). The patients with systemic diseases such as hypertension, diabetes, cardiac diseases should be followed well in the tertiary centers. Patients willing to be pregnant should be encouraged for the check-up control and seminars about the preconceptional care should be run.

Finally within the last decade MM rates has been decreased in Zonguldak province like the decrease in Turkey. The direct MMs are still existing despite the improvements in the health.

Competing interests

The authors declare that they have no competing interests.

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